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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/742,473	12/22/2000	Byung-Soo Ko	3430-0161P	9178

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EXAMINER

NGO, HUYEN LE

ART UNIT PAPER NUMBER

2871

DATE MAILED: 08/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/742,473

Applicant(s)

KO, BYUNG-SOO

Examiner

Julie-Huyen L. Ngo

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following features recited in the claims must be shown or the features canceled from the claims. No new matter should be entered.

In claim 1, "electrode line has a side portion having overhang or taper angle of more than 45° C". Drawings need to indicate the overhang or taper angle with reference signs. ✓

In claims 6 and 12, "a side portion of the second metal layer is over etched than that of the first and third metal layers." ✓

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The specification is objected as being insufficiently described how "a side portion of the first metal layer is over etched than that of the second metal layer," as recited in claims 3 and 9; and how "a side portion of the second metal layer is over etched than that of the first and third metal layers," as recited in claims 6 and 12. According to the description in the specification (page 5, and third paragraph of page 8), and fig. 5, the

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first and second metal layers or the first, second and third metal layers 60, 62 and 64 are simultaneously etched, then how can the first or second metal layer be over etched? ✓

The specification is objected to because the "taper angle of more than 45°C," in the second and last paragraphs of page 5, in the last line of page 8, and page 9, is indefinite. This renders the angle to have no upper limit.

In the penultimate line of page 6, it appears that "wire electrode 52" should be __ ✓
wire electrode 51 __.

Correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation in claims 1 and 7 calling for the taper angle of more than 45° ✓
degree C is indefinite and indeterminate in scope, since this recitation is open-ended, i.e., it has a lower limit but no upper limit. Also, it is unclear how the taper angle is determined with respect to other elements of the electrode line, e.g., the substrate.

In the last line of claim 7, "the electrode" lack antecedence. ✓

Claims not specifically mentioned above are rejected as bearing the defect(s) of the claim(s) from which they depend.

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Claim 3-6 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are:

In claim 3, the step of how to over etches the side portion of the first metal layer than the second metal layer.

In claim 6, the step of how to over etches the side portion of the second metal layer than the first and third metal layers."

Claims not specifically mentioned above are rejected as bearing the defect(s) of the claim(s) from which they depend.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 5 and 7 to 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al. (US6172733B1).

With respect to claims 1, 4, 5, 7, 10 and 11, Hong et al. teach (Figs. 5a-5c, col. 6 lines 37-67) a method of manufacturing an array substrate comprising:

- forming an electrode line (gate line 111) has a first (Al) and second (Mo) metal layers of dual layer structured on a substrate using a wet etching technique
- forming an organic insulating layer (gate insulating layer 117) on an exposed surface of the substrate while covering the electrode line

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wherein the end portion of the electrode line has a taper angle of more than 45° (see Figures 5d and 5e).

With respect to claims 2 and 8, Hong et al. teach (Figs. 5a-5c, col. 6 lines 61-67) forming an organic insulating layer (gate insulating layer 117) from one of benzocyclobutene, an acrylic-based insulating material or resin.

Claims 3, 6, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al. as applied to claims 1, 7 and 11 and in view of Hwang (US5852481)

Hwang teach (Figs. 2A-2D, col. 4, lines 7-44) a method of manufacturing an array substrate comprising:

- forming an electrode line (gate lines 200/210) having a first, second, and third metal layers of three-layered structure on a substrate with a single sputtering process for increasing yield and reducing cost (col. 2, lines 20-22);
wherein the end portion of the second metal layer 112 of electrode line 200/210 is over etched than that of the first metal layer for exposing the first metal layer 111 (col. 4, lines 61-67).

With respect to claims 3 and 9, it would have been obvious for one of ordinary skill in the art to over etch the first metal layer than the second metal layer of Hong electrode line for exposing the second metal layer, as taught by Hwang.

With respect to claims 6 and 12, it would have been obvious for one of ordinary skill in the art to form an electrode line as taught by Hong to have a first (Al), second (Mo), and third metal layers of three-layered structure on a substrate with a single sputtering process and using wet etching technique, which is a well known technique in

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the art as evidenced by Hong, for increasing yield and reducing cost, as taught by Hwang.

Further more, it would obvious to over etched the end portion of the second metal layer than that of the first and third metal layers of Hong/Hwang electrode line for exposing the first and the third metal layers, as taught by Hwang.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Kaneko et al. (US6433842B1) disclose a method of manufacturing of liquid crystal display with dual-layered gate line having the taper shape.


Jeong et al. (US6081308A) disclose a method of manufacturing of liquid crystal display with dual-layered gate line.

Kakuda et al. (US5162933) disclose an active matrix structure for liquid crystal display elements wherein an electrode line has an over hang portion (fig. 10).

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Julie Ngo, whose telephone number is (703) 305-3508.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.


Julie Nguyen L. Ngo
Patent Examiner
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August 22, 2002